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SOME FEATURES OF THE FIRST YEAR UNDER THE PURNELL ACT\*

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The past year has been the most conspicuous one in the expansion and development of the experiment stations since the national system was started. It has been an unusually important one because the Purnell Act has meant more than added funds; usually it has meant an enlargement of the research field, the selection of new personnel, the setting up of projects of greater definiteness, and the fitting of the new enterprises into the general plan for the stations' activity. These things have called for unusual administrative attention.

For an undertaking of such size, the success attending the first year seems to me one for sincere congratulation and encouragement. A fine disposition has been manifest to use the new fund in the spirit of the Act and of the understanding originally entered into; namely, to conserve it for a substantial type of new investigation, represented by definite projects to which allotments and expenditures are restricted, and incidentally to increase the amount and the range of cooperation in research. Such a policy of expenditure based on projects makes it possible to account for this large supplementary fund, and to answer inquiries as to how and to what purpose it is being employed.

The research programs of the stations have been not only greatly enlarged, but greatly strengthened and enriched under the new Act. A group of 690 projects had been outlined and put under way, up to November 1. For the most part they are high-grade undertakings, creditable from a research standpoint while looking to practical advantage in the applications of science. To summarize them briefly, 96 are in home economics, 224 in agricultural economics, and 23 in rural sociology; a total of 343 in these new subjects, compared with 347 in production lines.

In the field of production the largest number of projects relate to livestock, 83, with 26 additional in dairying and 17 in veterinary science. Soils

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and fertilizers, field crops, pastures, and plant improvement have a total of 87; horticulture and forestry, 38; plant diseases, 39; entomology, 43; and agricultural engineering, 16. •

Of the total number of projects taken up under the Purnell fund, 45 have been reported as completed or discontinued, the largest number (26) being in agricultural economics, followed by home economics with 12.

#### Home Economics.

Thirty-nine stations inaugurated investigations in home economics under the new fund. Of these, 37 projects related to food and nutrition in general, 27 to vitamins, 29 to household management, and 3 to clothing and textiles. The grand total of projects applicable to home economics is 105, carried on at 41 stations.

This is a very creditable beginning. Although work has not been inaugurated at all the stations, no lack of interest or support of this work has been observed. The difficulty has been rather one of finding persons suitably equipped for investigation, with the sudden expansion in this field.

The research attitude of the head of the home economics department has been a very important factor in promoting research, formulating research topics, and selecting people to carry them on. This attitude has varied quite widely. It is well developed in some, who have grasped the idea that successful research requires persons who have had special training for it, and that these are quite as likely to be found in the basic science departments as in those of home economics. Others, however, have evidenced less conception of research and less active interest in developing it, with results that are apparent.

The first year evidently has been a profitable one for many of the workers in home economics. It has given them a clearer conception of the essential qualities of research and of what this implies on the part of the investigator. The subject of nutrition is better organized than that of home management, for it has







been subjected to more research, going back many years, and more persons are available who have had graduate work of a severe type including advanced research in chemistry and the biologic sciences. In some other branches there has been considerable evidence of lack of preparation, with consequent difficulty in selecting and organizing suitable projects and carrying them through. The recent development has stimulated institutions to offer graduate courses in these branches, which will doubtless correct the situation in time.

In these early beginnings the inauguration of a project in home economics may call for quite as much attention to the qualifications of the proposer as to the merits of the project outline. A well set up project may be unproductive in the hands of an unqualified worker. The real test of some of the work under way, particularly in home management, will come when a point is reached which taxes the ability of the worker to handle and analyze the data she has secured. This stage already has arrived in several instances, with the apparent necessity of looking outside for help. To recognize one's weakness is a good sign, but too much reliance on an outside agency will transfer the real research out of the station. It appears that considerable of the work in this field at present will be more or less educational for the workers themselves, which probably was to have been expected.

Most of the vitamin projects are in the hands of workers trained in vitamin research, but there has been some tendency to attempt too ambitious a program and to start too many projects in that field. There are evidences that the first year has served to check the enthusiasm of the overambitious worker who failed at first to grasp the large responsibility of running such enterprises by herself.

Cooperation with other departments of the college or the station is proving of advantage. This is well illustrated by a textile research project in one institution which has the active cooperation and enthusiastic support of the





physics department, and an electricity project at another in which the departments of agricultural and electrical engineering are cooperating with the home economics department.

It is not surprising to find some research workers in this field with an overloaded teaching schedule. This has hampered and curtailed the investigation the past year at several institutions, and it is to be hoped it will be adjusted, as it has been in other departments in the past. The disadvantage to research of employment on a nine months basis need only be mentioned here.

Considering the newness of the field and the scarcity of experienced workers in it, there is much ground for gratification and encouragement at the showing made in home economics this first year. Some of the research is of as high grade as that in most other station departments, while much of the rest is quite up to expectation for this stage.

#### Agricultural Economics.

The largest number of new projects under the Purnell Act is in agricultural economics. All the States but one have undertaken investigations in this field, and fourteen have set up projects in rural sociology. Of the 224 projects in economics, 107 relate to marketing, 35 to farm management, 45 to the economics and cost of production, and the remainder to taxation, credit, land values, and miscellaneous. Eighteen of the sociology projects relate to rural social organization and the other five to rural population.

While the progress in the economic field gives ample ground for optimism, it reveals certain needs from the point of view of research policy. In an effort to satisfy the public demand for immediate information, some of the studies undertaken have been rather sketchy, and the touch-and-go method has been in considerable evidence. A consequence has been that some of the publications are little more than catalogues of current practice, without developing economic facts and relationships. Haste and the scarcity of well prepared and experienced workers





is mainly responsible for this. There is no better evidence of the general recognition of the need for workers with special training for research than is to be found in the expansion of graduate study in agricultural economics throughout the country.

There is a noticeable tendency to make a study cover such a broad field and such a multiplicity of factors that it is difficult to trace causal relationships. Such general studies have served as a reconnaissance, and have had the frequent advantage of pointing to more specific projects which lend themselves to detailed investigation. It will be important that such leads be followed up, for steady advance of a more permanent character will depend on concentration on specific problems with definite objectives, employing greater detail and precision in methods of procedure.

In certain types of investigation, the coordination or association of economic research with that in other specialties seems important. For example, it is becoming more and more apparent that marketing problems can not be solved fully if their relation to production problems is left out of consideration. The need is not only to market economically what farms are producing, but likewise to produce economically what the markets want. Orderly marketing requires attention to orderly production. With changes in market demand it is necessary to ascertain the possibilities of production to meet those changes. Similar relations are apparent in the field of farm organization. Greater diversification may be desirable in a region from the standpoint of economy and risk in production, but this requires the aid of the agronomist, the animal husbandman, and other specialists in developing an effective program of diversification.

Steps in the direction of bringing together the economic investigators and the specialists in production fields are being taken at several of the stations. Beyond this, coordination among workers to minimize duplication and to secure comparable results is to be looked forward to in future. Specialization of work-





ers in economics is also to be anticipated, as this not only encourages specialized knowledge but makes for concentration and more intensive study.

#### The Survey.

The survey as a method has assumed tremendous proportions under the Purcell Act. A calculation some time back showed that fully a third of the first appropriation was to be used on projects which depended on the survey or questionnaire for getting the data, a total of more than \$330,000 in a single year.

This indicates how largely reliance is being placed upon this method of exploration and investigation. How adequate it is will be discovered later when more experience has been had and the results come to be published. With some the survey has been conceived to be a quick means of cutting across the tedious path of experiment and investigation. Doubtless it will settle into its real place, but it is important at this stage to consider its limitations, to form a clear conception of what it may be adequate to accomplish, and the manner in which it may need to be supplemented. Evidently many questions that lie out in the field will need field study quite as much as a survey, for often the results of the survey will be tentative, suggestive rather than final, needing to be treated as the beginning or a feature of an investigation and not as the end of it.

A frequent difficulty with the survey is that it is too hasty and superficial to get at the real situation very thoroughly. Often it is directed at complicated, many-sided situations, and yet it sometimes attacks them in what seems a rather casual way, in part with the aid of people unacquainted with research methods. Some of these surveys appear merely to open up the problem, to give a picture of the situation and a background for investigation, without completing the research part or making definite plans for the follow-up.

I do not wish to seem unduly critical or unappreciative of this type of work, for I realize the important part the survey must play in certain lines of investigation and the frequent need of a reconnoissance to disclose the general





situation; but the prominence the survey has assumed, the confidence and satisfaction of some of its advocates, and its popularity with the public make projects which depend largely upon it worthy of careful consideration from the standpoint of the real objective and the research procedure. Such surveys give many items of public interest and their popularity has made demand for them quite active, even to the interruption of the more intensive follow-up. This may tend to over-emphasize the actual importance of broad general surveys of an industry or a region, for in research light needs to be developed as well as interest aroused. Research looks toward a solution, a remedy, a suggestion, rather than a statement of the case; the "picture" based on a reconnoissance may be interesting but requires investigation to develop economic facts or suggestions. Facts of observation are sometimes given the dignity of economic facts, whereas in reality they stand for individual practices.

The field is the laboratory in certain types of research. In such cases the taking of the data and the study of them in their setting are just as essential in discerning the real situation as the summation of the data in the office, and this field study, in my judgment, can not be delegated to students, extension agents, and a similar type of help. It is not alone what the field data show, but what they suggest to the discerning investigator that gives them vital force in constructive research.

#### Some Types of Experimentation.

The term investigation is frequently used rather loosely and in a way not in conformity with its real character as applied to research. In popular parlance investigation means to look into a situation, or to go and see. This, of course, is not the meaning we ascribe to investigation as a research activity, but it must be admitted that quite a little work so designated partakes of the "look-see" character, into which the worker puts little of originality or the element of inquiry.





One of the distinguishing features of investigation is the skill expressed in deriving and marshaling facts; and this begins with the control exercised over the conditions and the number of variables, so that an intelligible answer may be secured, and the checks on the results to measure and reduce the element of error. This, of course, is so elementary as to be a commonplace in experimental technique. But how does the case stand in an all too common type of feeding experiment designed to compare various components in a grain ration? These are fed to groups of pigs in a short period, the various constituents being given in self-feeders ad libitum and with free choice as to the basal feeds and those under comparison, thus permitting no individual records of feed or of the way in which the pigs selected their rations. Experimental control is almost eliminated and checks are lacking, without even replications. Results obtained in this way can only be regarded as circumstantial and tentative, and have no particular connection with science or theory.

Again, in the comparison of feeding stuffs in mixed rations it may happen that nothing is learned of the qualities or deficiencies of individual feeds, because no account is taken of the amount of digestible nutrients furnished or the vitamin or ash content, or the form of the proteins, and there is no basis for a statistical study of the results. These qualities and factors which research has taught us differ so much in feeds are ignored in the attempt at interpretation of results. Such work naturally encourages repetition and duplication, for it does not go far beneath the surface and its results are not safely applied where economic and other conditions vary.

There are still many experiments of the purely comparative type which have only a very short-range objective; they have in mind a purely local or temporary situation, a practical question viewed from that standpoint. Such experiments, while attempting to get the practical answer, do not use the opportunity to enlarge the view from the scientific or theoretical standpoint,





or go into the matter of causes and relationships. They are supposed to be purely practical, but frequently they are unpractical because they are so limited in their viewpoint and contribute so little real information. They add experimental experience, frequently as difficult to interpret scientifically as practical experience is.

Haste and superficiality have been justified in the past by pressure for results and lack of means; they ought not to be made an excuse now with the increased resources. We may not expect absolute facts, but we may approach closer to them as the years go by. Much work naturally must be of the cut-and-try order, but it ought not to be devoid of an idea. It is the idea guiding the cutting and trying that makes it an intellectual effort rather than a mechanical one, and differentiates it from the "look-see" type of investigation.

#### Motive in Research.

The formulation of the Purnell program has furnished opportunity for the elimination of moribund or unproductive projects, and for the introduction of more modern concepts and methods of research. These build on past work, without repetition of antiquated and no longer productive procedures; and they evidence a purpose to go beyond recording observed facts and consider more profoundly their relations and meaning. The latter is a notable characteristic of a large proportion of the newer projects. They aim to make the results less empirical, in order to give a more intelligent basis to support conclusions or recommendations, and to make generalizations safer for both the investigator and the practical man. When we recall how large a proportion of agricultural knowledge has been of the empirical kind, the significance of this new effort to build facts which are not only supposedly practical but likewise actually scientific is apparent. To make a fact more intelligible and dependable is to make it more practical, for it is a safer basis for reasoning and judgment.





When the farmer and the extension worker call for practical information they really mean that which is less empirical, applicable in general or under defined conditions, and sufficiently understood to allow the exercise of judgment. This latter, the exercise of practical judgment, is one of the ultimate goals. Qualifications often are necessary and they are a mark of understanding of general truths, but if knowledge of a fact is so limited that it must be hedged about with ifs, buts, and other cautions, its practical value is limited and it may not be a safe basis for practical judgment.

The question of making investigation sound and thorough is not, therefore, one of practical versus fundamental aims, but applies rather to a type of work designed to give results that can be applied intelligently and relied upon in practice. There is no conflict if the motive is sincere. The past year has witnessed more advance in this direction than any previous year, even that in which the Adams fund began, for we now know better the meaning of thoroughness in investigation and how to carry it on.

But while the average of the new projects is high, the range in character is a wide one, and the motive and standard as reflected by the proposal in some cases are quite elementary. There is still frequent failure, for example, to take account of what already is known, a disposition to consider only what the leader is familiar with and not to make a sufficient survey of the literature to show the real status of the question. This affects the character of the undertaking. Research, whatever its grade, proposes to make a contribution, not merely an addition. This calls for knowledge of the status of the subject, from which can be formed a clear view of what remains to be done to advance it, or to test the application of previous findings. It is this which distinguishes it from unguarded repetition or demonstration. A new project is "the substance of things hoped for"; manifestly it ought not to be the sad "evidence of things not seen."





There is a quite noticeable tendency to set up large, comprehensive projects which, in their caption and often in their outline, indicate little discrimination or differentiation of complex problems. A frequent example is A Study of the Factors Influencing the Quality and Palatability of Meat, in some cases describing a blanket project covering all of the various factors such as effect of age, breed, sex, weight and condition of animals at the beginning, and the effect of different kinds of feed and management. This evidently misconstrues the national problem as being a unit for investigation, rather than one under which a variety of individual projects are to be organized. Without differentiation, such a large unit gives little or no idea of what is actually in mind to be done. Although a project may enumerate twelve or fifteen different objectives, it may turn out to plan no very constructive study of any of them.

A similar tendency toward broad proposals for investigation is evident in some other lines, as shown by projects on "the farm problem," "the farm land problem," studies of prices of agricultural products of a State, the place of livestock or of a type of farming in a wide section, etc. Complexity ought not to be mistaken for profundity, for in the end it may be found to mean dissipation in the pursuit of many things rather than concentration on something in particular. It may be desirable to have a far-reaching aim, but this is not opposed to taking one step at a time.

#### Ready-made Projects.

One effect of the cooperative projects set up by Committees of this Association has been to relieve workers of study in the preparation of their project outlines. This is due to following the outlines as they were suggested without limitation or adaptation to particular circumstances. It has made the start easy, but it has not put any test on the ability of the worker to state a project and devise ways and means. The difficulties have developed later,





with important matters to be determined or provided for hastily after the work has overtaken them. Hazy indefiniteness as to the essential steps, the requirements, the scope, and the lay-out, point to a lack of consideration at the outset which is likely to be expensive in the end.

Aside from these national proposals, there seems to be a considerable disposition to accept ready-made projects, especially in cooperation. Some stations fall in with a proposal without being very clear as to what they themselves are to do of a technical nature. They are to be a part of the co-operative enterprise, but just how they are to function and what responsible part rests with them is not set forth in the plan. Admitting that cooperation may imply a measure of conformity to the plans of a group, joint effort does not eliminate individuality or relieve participants of responsibility. On the contrary, to have a real part in a cooperative enterprise those associated in it ought to have a voice in determining what data are necessary, in securing such data, and in their subsequent interpretation. And in the interest of the effectiveness of the undertaking, these things ought to be clarified at the outset.

#### Obligations of the States.

The responsibilities of the States in relation to this supplementary legislation have been referred to quite definitely on a number of occasions, but in the interest of clear understanding it may be desirable to again call attention to this matter as having a fundamental bearing on the success of the enlarged enterprise.

The Purnell Act, like its predecessors, is not conditioned on similar contributions from the States. In this respect it will be recognized as a departure from recent legislation in which the Federal Government has joined with the States in promoting various measures of public interest. The advisability of incorporating such a contributory provision was considered at



the time the legislation was being framed and again when it was being advocated in Congress, but, on the strength of the arguments presented by representatives of the Association of Land-Grant Colleges and the record of nearly forty years, such a requirement was omitted from the Act as passed. The absence of it will evidently make it important to avoid any seeming departure from the tacit understanding implied.

In his address at the Conference of Agricultural Colleges and Experiment Stations at St. Louis in 1925, soon after the passage of the Purnell Act, the Secretary of Agriculture called attention to the fact that in effect the maintenance of experiment stations "always has been a cooperative enterprise between the Federal Government and the States. The Hatch Act, which supplied the initiative for the national system, did not undertake to carry the whole burden. It was designed, as the opening sentence stated, 'to aid' in attaining the objects sought in the establishment of these institutions." He pointed out that "in advocating this latest legislation much emphasis was laid on what the States are now doing, and on the fact that it was not designed to relieve them but rather to stimulate and further extend their efforts." And again, that the Purnell Act "is not designed to transfer these obligations to the Federal Government, but to enable the latter to join more liberally with the States in the maintenance of investigation at these institutions...It is the confident expectation, therefore, that the individual States will continue to bear their part."

This view was borne out in the Report of the Committee on Experiment Station Organization and Policy at the Convention a year ago, which was adopted by the Association. The report declared that, in view of the conditions under which the new legislation was secured, "the policy should be to continue present local support on at least the present plane, in order that the States may sustain their obligations. To do otherwise would be not





to keep faith with Congress and to lay the institutions open to serious criticism. State funds will be needed to supplement the Purnell fund and to take care of expenses of a general nature. Each State already has an experiment station with its organization, its administrative machinery, and in large measure the buildings, lands, and other basic facilities for research; and the Purnell Act attempts to build on top of what already exists, its primary purpose being to develop further investigation and experiment."

At the same meeting the Report of the Executive Committee further emphasized the fact that the Purnell Act "definitely provided appropriations 'in addition to' all Federal and State funds heretofore made available for station support"; that "the Purnell monies were not made available in order to relieve State treasuries but because of the vital need in agriculture"; and that "in all the arguments on the basis of which Congress acted public needs were stressed, and that no one suggested or thought of lessening State appropriations." It was maintained, therefore, that "for a State to assume to the contrary is unwarranted and that to take advantage of the opportunity constitutes bad faith," which might endanger succeeding increments or the continuance of the appropriation.

The adoption of these reports by the Executive Body of the Association is evidence of the avowed policy of the Association of Land-Grant Colleges with reference to the Purnell fund and the obligations of the States under the Act. The spirit expressed in this policy may be expected to be far more potent than any effect of the mere phrasing of the law.

The general response of the colleges and the States to this increased Federal appropriation has been one of hearty cooperation. It should be noted, however, that occasional exceptions have come to light which, while they do not constitute ground for any widespread apprehension, may need to be met. These exceptions take the form of proposals to reduce State appropriations in





a measure commensurate with the increase of the Purnell fund, or to lessen the allotment of funds to the station out of general appropriations to the college. Such action would of course minimize the relief which the Purnell fund has provided, and might even leave stations in less favorable financial condition. Already the restriction on administrative and overhead expenses has burdened other funds to some extent, because of the inevitable expense attendant on the establishment of new departments, and the growth to come will increase the need for unrestricted funds. Hence in all fairness to the stations, which have so long waited for more liberal support, the suggestion of curtailment of allotments or appropriations will deserve to be met with disapproval and opposition, in order to preserve the welfare of the stations as a body. Such a reduction in local support is just what opponents of the Purnell Bill charged might be expected unless guarded against in the Act. To accomplish the same end by indirection, through readjustment of salaries and assignments, purchase of land, provision of needed buildings, and transfer of other expenses heretofore borne by State funds may be equally objectionable.

The Purnell Act very liberally increases the proportion of funds which may be used for buildings and land. The purpose of this was to meet special exigencies growing out of new investigation, some of which might be expected to require temporary facilities in enlarged degree. On this point, however, the Report of the Executive Committee referred to above makes it clear that "these Purnell monies are made available to going concerns, that they should not be used for building purposes, but should be used for work done in buildings already erected or otherwise financed." This is in accordance with the practice which has been followed consistently since the stations were organized, the essential lands and buildings for permanent use being provided by local funds. Naturally it will be expected that the permissive authority car-





ried in the Act will be carefully guarded in order to comply with the spirit of the Act and the interpretation to which the States are committed. Capital expenditures, except such incidental ones as arise from the needs of individual projects, will therefore not be expected on the Purnell fund.

#### Demands of Administration.

I feel sure that these observations will not be misunderstood as implying any general criticism or reflection on the splendid beginning which has been made under this new Act. The aim has been rather to point out some features which have developed in this large expansion of research, and to invite attention to several matters which may need to be kept in mind as the work progresses. There is every prospect that the Purnell Act will express a high standard of purpose, technique, and constructive ability. The first year's experience warrants the expectation that the work under it not only will be suited to the needs of the time, but in its conception and its conduct will express "the time of day" in agricultural research.

This will mean that projects will answer the test of What, How, and Why-- i. e., have a definite objective, an adequate procedure, and a considered purpose. The objective will connote intelligence and clear thinking in differentiating the things to be done from those already known; the plan of procedure will evidence a critical weighing of ways and means; and the Why will show that there is a motive behind the investigation which makes it worth while.

The provision of conditions for realizing the expectations the Purnell Act has aroused rests in the first instance with station directors. It is no light task, as you already have found, and the responsibility is too large to be slighted. It will be heavier next year and the next, for the new lines of work will need intelligent supervision and the making of plans for a well considered, growing research program will require increasing attention.

This is a time, therefore, for strengthening the organization and the



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This is a time, therefore, for strengthening the organization and the

administration to meet this enlarged demand and responsibility. It can not safely be made a secondary consideration. Time for study and deliberation is needed by administrative officers as never before, and this will inevitably call for some relief of the combined dean and director. Happy the one who has so organized and delegated his manifold duties as to reserve needed time for the large matters of station administration.



